

New species of *Eupithecia* (Lepidoptera, Geometridae) from China, part VIVladimir G. MIRONOV¹⁾, Sir Anthony GALSWORTHY²⁾, XUE Dayong³⁾ and Oleg PEKARSKY⁴⁾¹⁾ Zoological Institute RAS, Universitetskaja nab., 1, RU-199034, Saint Petersburg, Russia²⁾ The Natural History Museum, Cromwell Road, SW7 5BD, London, United Kingdom³⁾ Institute of Zoology Chinese Academy of Sciences, 19 Zhongguancun Lu Haidian, Beijing, 100080, China⁴⁾ Felsoerdosor u. 16-18, 2/15, H-1068, Budapest, Hungary

Abstract Fourteen new species of *Eupithecia* (Lepidoptera, Geometridae), *Eupithecia lilliputata* sp. n., *E. boneta* sp. n., *E. missionerata* sp. n., *E. wangi* sp. n., *E. admiranda* sp. n., *E. hongxiangae* sp. n., *E. hoenehermanni* sp. n., *E. buyseata* sp. n., *E. amandae* sp. n., *E. manifesta* sp. n., *E. tamara* sp. n., *E. qinlingata* sp. n., *E. svetlanae* sp. n. and *E. tectaria* sp. n., are described from China.

Key words China, revision, new species, taxonomy.

Introduction

This is the sixth in a series of papers describing new species of Chinese *Eupithecia* from collections in Bonn, Budapest, London, Beijing and Tokyo (Mironov, Galsworthy and Xue, 2004a, 2004b, 2004c, 2004d, 2006). In this paper we describe a further fourteen new species (*Eupithecia lilliputata* sp. n., *E. boneta* sp. n., *E. missionerata* sp. n., *E. wangi* sp. n., *E. admiranda* sp. n., *E. hongxiangae* sp. n., *E. hoenehermanni* sp. n., *E. buyseata* sp. n., *E. amandae* sp. n., *E. manifesta* sp. n., *E. tamara* sp. n., *E. qinlingata* sp. n., *E. svetlanae* sp. n. and *E. tectaria* sp. n.). We also clarify the status of *Eupithecia sacrosancta* Vojnits, 1979.

Abbreviations: ZFMK: Zoologisches Forschungsinstitut und Museum Alexander Koenig, Bonn, Germany; TTM: Termesztudományi Múzeum Allattara (Hungarian Natural History Museum), Budapest, Hungary; BMNH: The Natural History Museum, London, United Kingdom; IZCAS: Institute of Zoology, Chinese Academy of Sciences, Beijing, China; NSMT: National Science Museum, Tokyo, Japan; SCAU: South China Agricultural University, Guangzhou, China; ZISP: Zoological Institute of Russian Academy of Sciences, Saint Petersburg, Russia.

Eupithecia lilliputata Mironov & Galsworthy, **sp. n.** (Fig. 1)

Description. A small species. Wingspan 13–15 mm, fore wing 7–8 mm. Fore wing triangular with slightly arched costal margin and more or less pointed apex; ground colour rusty ochreous; basal and medial areas along costa dark brown, forming a narrow basal streak, and a broader, slightly broken, medial mark on costa; transverse lines very narrow, sinuous, but rather inconspicuous; terminal area darker, rusty between postmedial and subterminal transverse lines; subterminal line wavy, whitish; discal

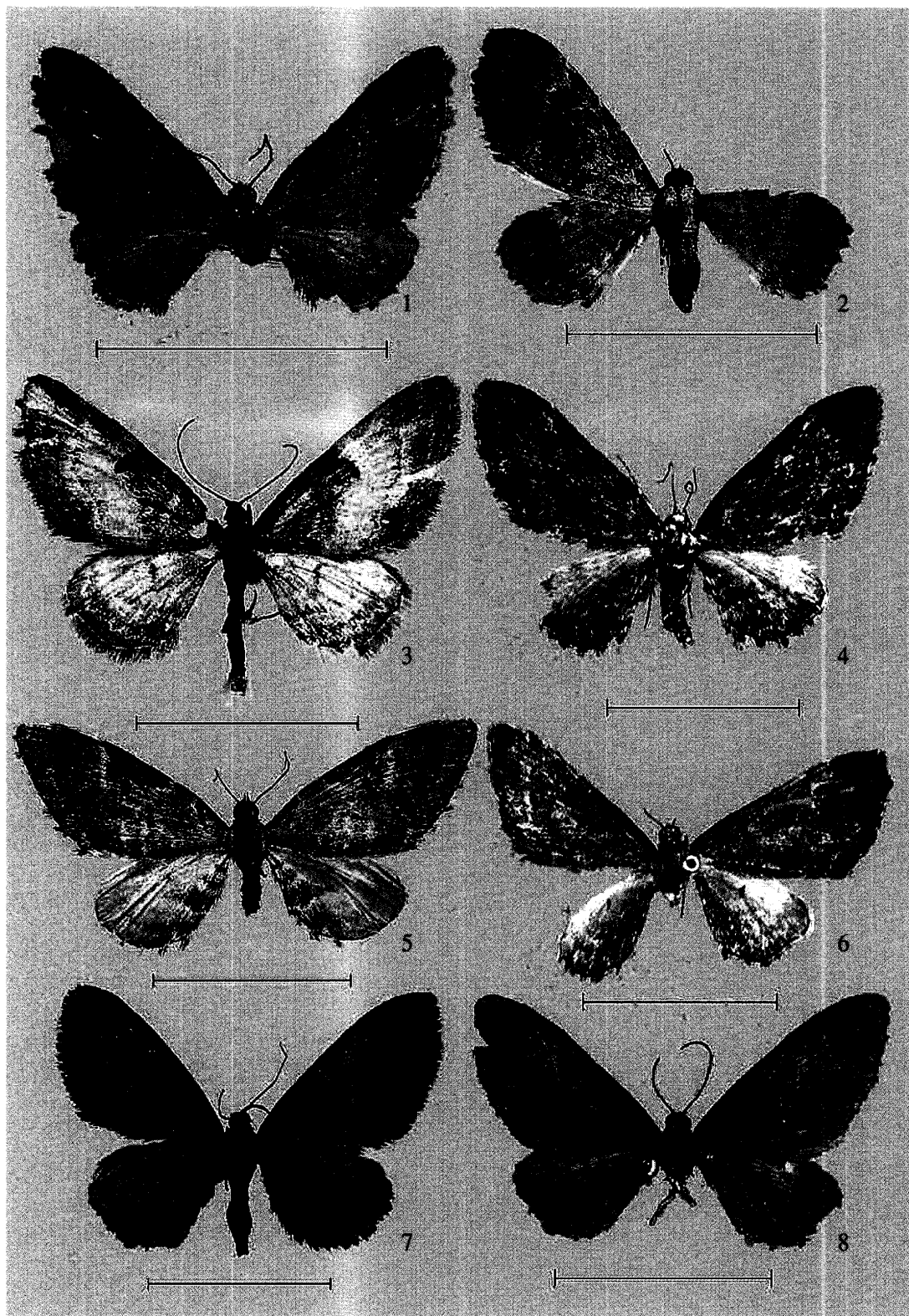
dot small, black, ovate; terminal line dark brown; fringes dirty white, spotted with brown at vein ends. Hind wing angled at M3, with narrowly rounded apex and slightly concave termen; ground colour paler, off-white, with weak ochreous tinge; dark transverse lines (basal, ante- and postmedial) weakly marked, brownish; discal dot very small, pale, rounded; terminal line and fringes as fore wing.

Male genitalia (Fig. 17). Uncus broad, but finely tipped. Valva rather elongate, parallel-sided except for the gently tapering broadly curved apex. Vinculum semicircular. Papillae on anterior arms of labides parallel-sided, clothed at apices with short setae. Aedeagus shorter than valva, fairly stout, with a single plate-like cornutus, tapering at apex and bifid at base. Sternite A8 with two long, narrow arms; apical hollow very deep, basal hollow shallow.

Female genitalia (Fig. 20). Bursa copulatrix ovoid, slightly narrowed to anterior end, and covered with small spines apart from a diagonal medial area and areas adjacent to the ductus seminalis and colliculum. Ductus bursae not distinct from corpus. Ductus seminalis narrow, attached to central part of corpus bursae from right side in ventral view. Colliculum elongate and narrow. Antrum membranous, narrow and elongate. Tergite A8 small, narrow and elongate. Anterior and posterior apophyses narrow, elongate. Papillae anales small, narrowed to apices and covered with medium-sized setae.

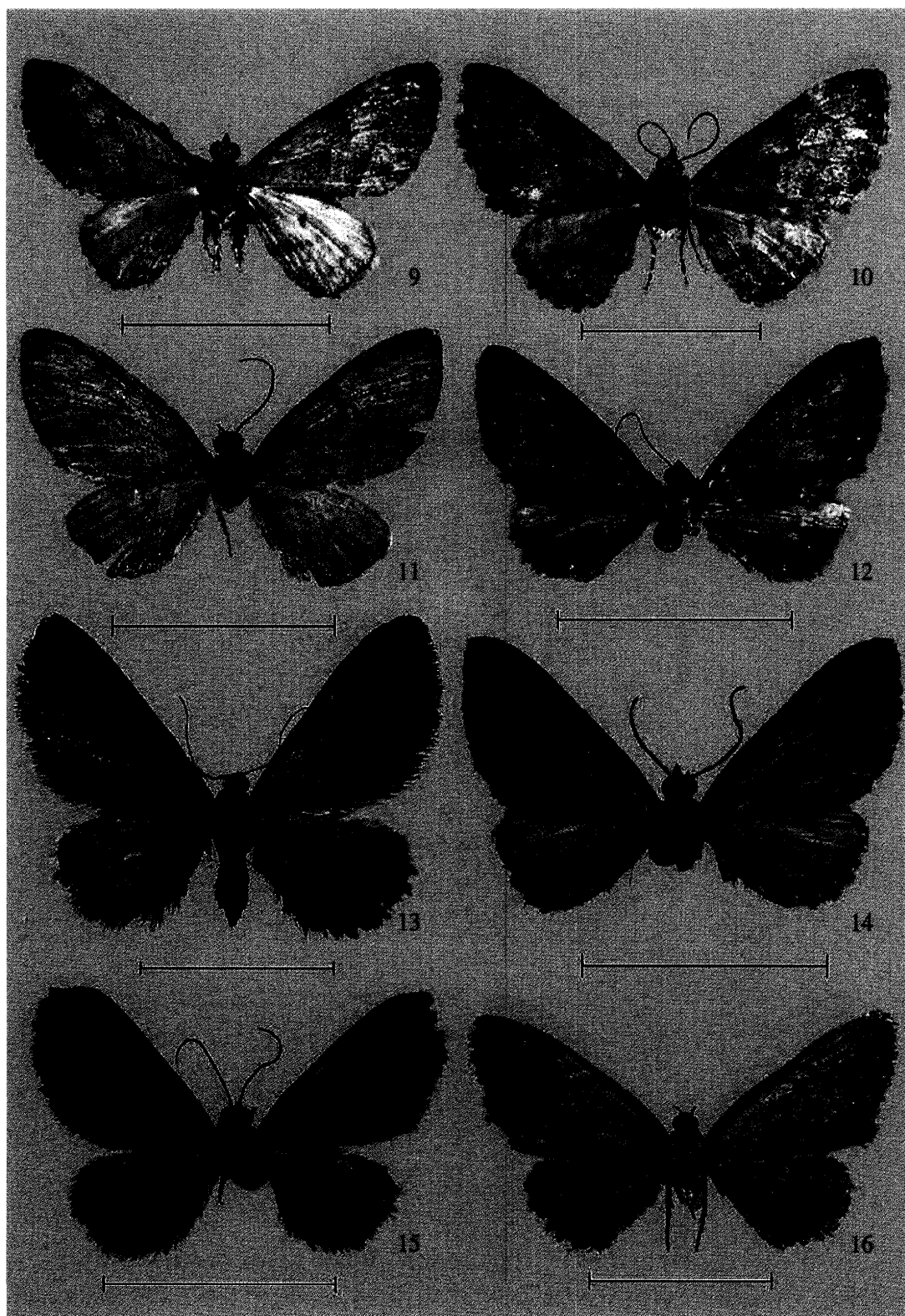
Range. China (Yunnan).

Similar species. The present species is externally similar to *E. fletcheri* Prout, 1926 (southern Himalayas), but much smaller, the dark medial area of the fore wing being well marked between costa and discal dot only, the hind wing whitish and generally paler, and without a dark basal area



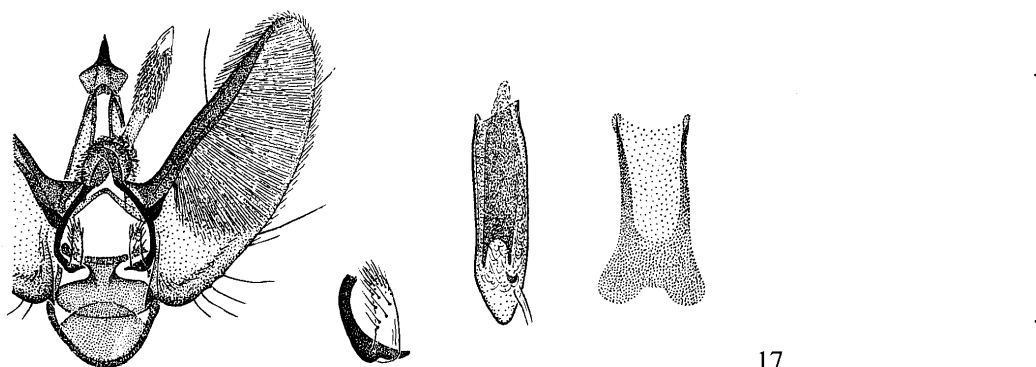
Figs 1–8. *Eupithecia* adults (scale bar = 10 mm).

1: *E. lilliputata* sp. n. (paratype). 2: *E. boneta* sp. n. (holotype). 3: *E. missionerata* sp. n. (holotype). 4: *E. wangi* sp. n. (paratype). 5: *E. admiranda* sp. n. (holotype). 6: *E. hongxiangae* sp. n. (holotype). 7: *E. hoenehermanni* sp. n. (paratype). 8: *E. buyseata* sp. n. (holotype).

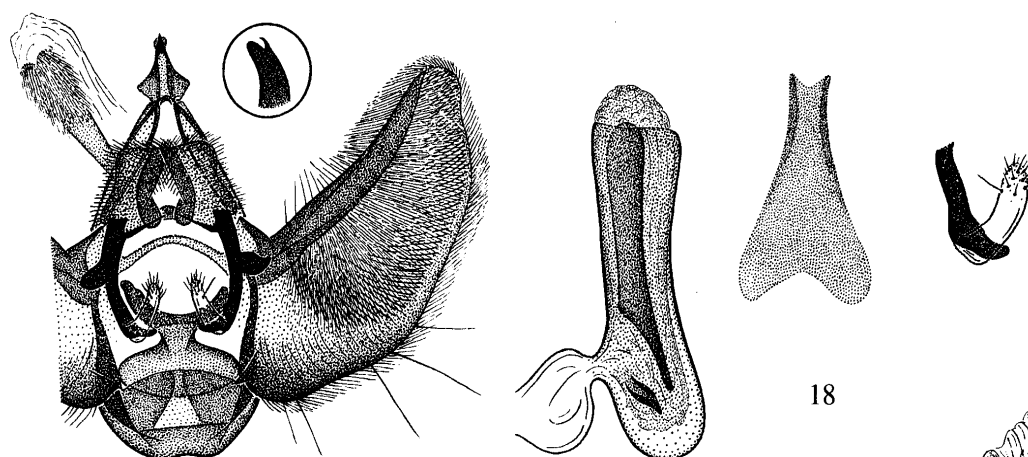


Figs 9–16. *Eupithecia* adults (scale bar = 10 mm).

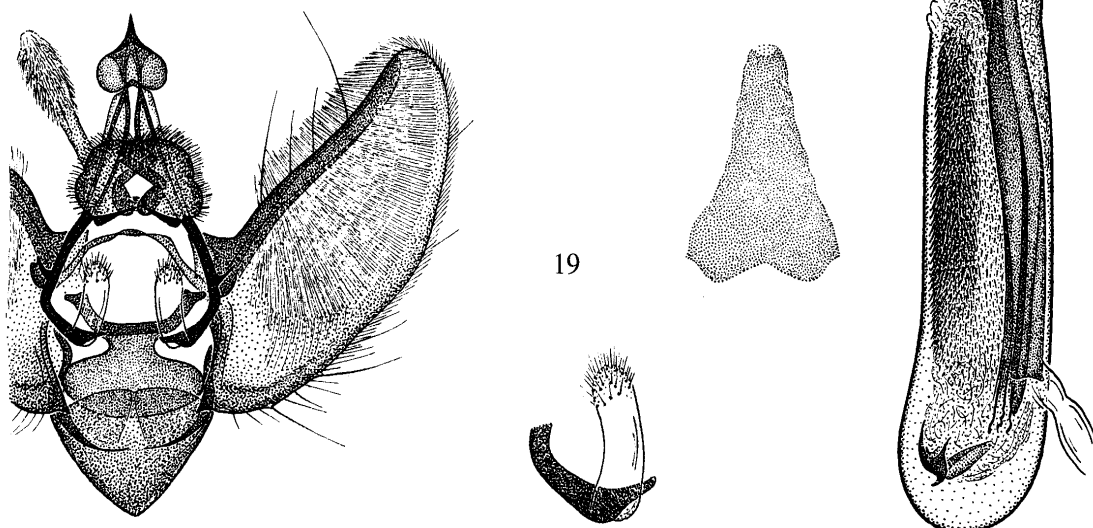
9: *E. amandae* sp. n. (holotype ♂). 10: *E. amandae* sp. n. (paratype ♀). 11: *E. sacrosancta* Vojnits, 1979. 12: *E. manifesta* sp. n. (holotype). 13: *E. tamara* sp. n. (holotype). 14: *E. qinlingata* sp. n. (holotype). 15: *E. svetlanae* sp. n. (holotype). 16: *E. tectaria* sp. n. (holotype).



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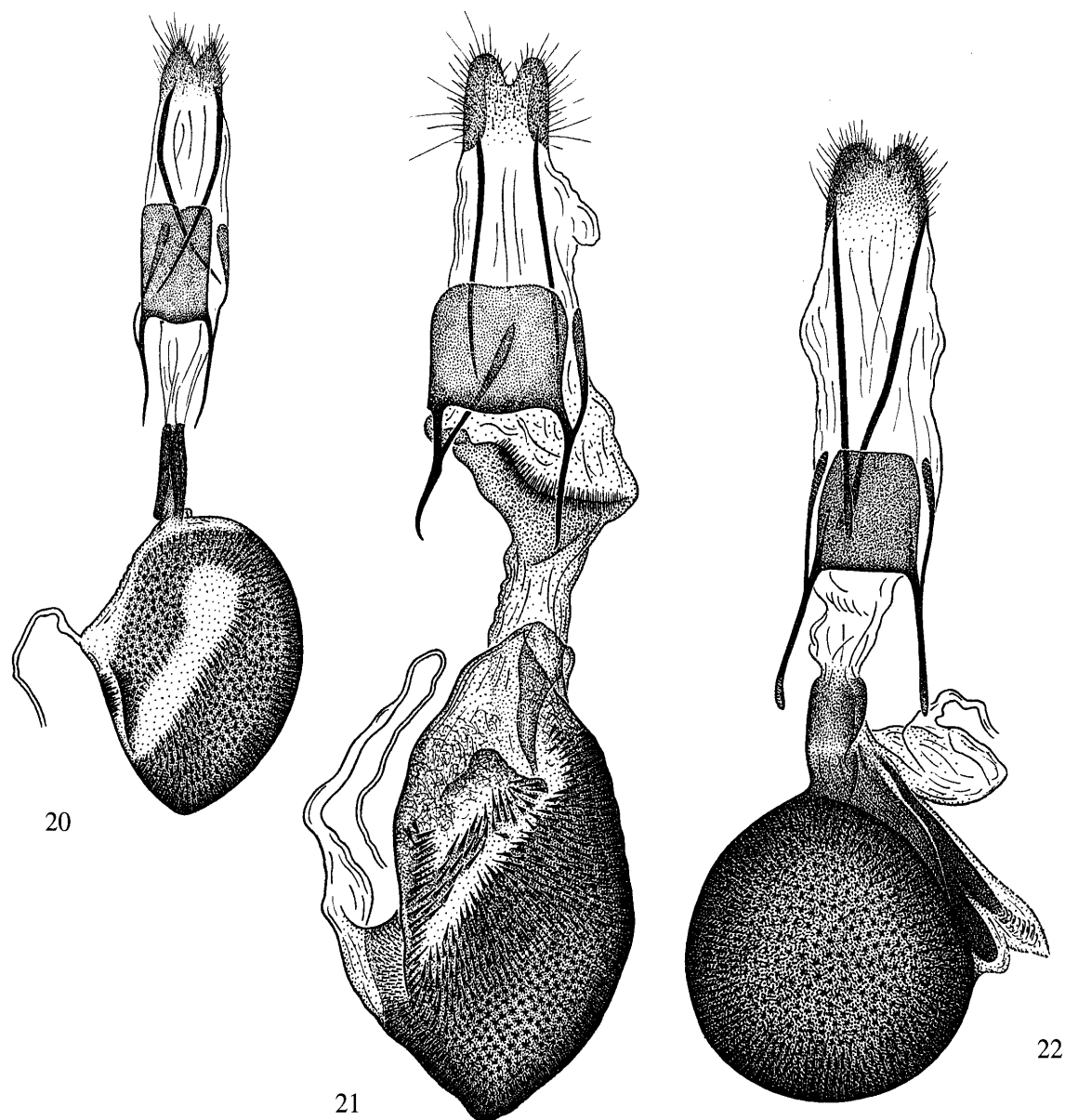
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Figs 17–19. Male genitalia of *Eupithecia* species (scale bar = 1 mm: with sternite A8, and lateral view of uncus and papillae on the anterior arms of labides enlarged).

17: *E. lilliputata* sp. n. 18: *E. missionerata* sp. n. 19: *E. wangi* sp. n.



Figs 20–22. Female genitalia of *Eupithecia* species (scale bar = 1 mm).

20: *E. lilliputata* sp. n. 21: *E. wangi* sp. n. 22: *E. boneta* sp. n.

along the anal margin and a rusty ochreous terminal area, which are present in *E. fletcheri*. The female genitalia of *E. lilliputata* are distinct from those of *E. fletcheri*: the bursa copulatrix is considerably larger, and egg-shaped, and unlike *E. fletcheri*, is not completely covered with small spines; the ductus seminalis is attached to the middle part of the corpus bursae rather than the posterior end, the colliculum is longer, the eighth tergite is much narrower, and the papillae anales are smaller and shorter.

Holotype: 1 ♀, China, Yunnan, Li-kiang [Lijiang], 11. ix.1934, H. Höne, Vojnits slide no. 12249 ♀ (ZFMK).

Paratype: 1 ♂, same locality, date and collector, Vojnits slide no. 12247 ♂ (ZFMK).

***Eupithecia boneta* Mironov & Galsworthy, sp. n.** (Fig. 2)

Description. Wingspan 16 mm; fore wing 9 mm. Labial palpi brown with white apical scales. Frons, vertex, frontal part of notum and short basal part of patagia brown; most of remaining part of patagia and posterior half of notum covered with white scales. Fore wing relatively broad with slightly bowed costal margin, slightly curved termen and rather obtuse apex; ground colour chocolate-

brown; basal area brown along costa and white with mixture of brown scales on the posterior part; medial and terminal areas deep chocolate-brown; basal, medial and terminal areas divided by double, narrow, whitish, transverse lines; antemedial line right angled onto costa and evenly curved towards tornus; postmedial line twice slightly curved near costa; terminal area with very narrow, wavy, whitish subterminal line; discal dot almost invisible; fringe light brown, slightly chequered. Hind wing off-white, with broad but weakly visible brownish transverse lines; medial and terminal areas divided by a slightly curved broad whitish band; terminal area relatively broad, narrower towards tornus and darker, with a weakly visible white, dentate subterminal line; discal dot small, brownish, crescent-shaped. First three abdominal segments white with sparse brown scales, all other segments rusty brown.

Female genitalia (Fig. 22). Bursa copulatrix relatively large, globular, completely covered with small spines, with an oblique, narrow, heavily sclerotized appendage, which is slightly bisected at the apex, in the middle of the corpus bursae at the left side; the tip of this appendage is membranous. Ductus bursae short, sclerotized. Ductus seminalis broad and sharply curved at base, attached to ductus bursae near base of colliculum at left side. Colliculum rather short and narrow, lightly sclerotized. Antrum membranous. Anterior and posterior apophyses relatively elongate, narrow, slightly expanded and flattened at apices. Tergite A8 small, almost quadrate with narrowly sclerotized anterior margin and basal part of lateral margins. Papillae anales relatively short, narrow, rounded, covered with sparse medium-sized setae.

Male unknown.

Range. China (Yunnan).

Similar species. Externally *E. boneta* is reminiscent of *E. bohatschi* Staudinger, 1897 (NE Asia to Himalayas), but is easily distinguished from the latter by the full chocolate-brown fore wing with only fine, whitish, double transverse lines between the basal and medial, and medial and terminal areas, by the almost invisible discal dot, and also by the darker hind wing with a straighter white transverse band between medial and terminal areas. The female genitalia of *E. boneta* are very clearly distinguished from those of all other Chinese *Eupithecia* species by the globular corpus bursae with an oblique, narrow, heavily sclerotized appendage from the bases of the colliculum and ductus seminalis to the middle of the bursa at the left side.

Holotype: ♀, China, Provinz Nord-Yuennan, Li-kiang [Lijiang], 7. ix. 1934, H. Höne, Mironov slide no. 697 ♀ (ZFMK).

Remarks. The unique holotype specimen is missing the right fore wing.

Eupithecia missionerata Mironov & Galsworthy, sp. n. (Fig. 3)

Description. Wingspan 19.5 mm; fore wing 10.5 mm. Labial palpi, frons, vertex and notum covered with dark brown scales. Fore wing rather broad with slightly bowed costal margin, evenly curved termen and narrowly rounded apex; basal part of fore wing brown from base to slightly sinuous oblique antemedial transverse line, which crosses discal dot and is sharply angled onto costa; discal dot small, distinct, black, oblique and ovoid; medial area off-white with a yellowish tinge, brownish along costa; postmedial line very narrow, formed by a series of brown dots on the veins, curved and sharply angled onto costa; terminal area dark brown with narrow light subterminal line; terminal line broad, dark brown, interrupted by veins; fringe pale brown with darker brown patches at vein ends. Hind wing paler, off-white with a yellowish tinge; basal and postmedial transverse lines brown, well marked along anal margin; terminal area darker, brownish, especially near tornus; discal dot elongate and narrow; terminal line and fringe lighter than on fore wing.

Male genitalia (Fig. 18). Uncus short and narrow, biapical. Valva shaped like an orange segment, with slightly curved dorsal margin, sinuate near the tip and with an abruptly narrow rounded apex; sacculus lightly sclerotized. Vinculum short, with very shallow medial hollow. Papillae on the anterior arms of labides relatively narrow, covered with sparse short setae at their apices. Aedeagus slightly shorter than length of valva. Vesica multiply granulate and armed with one elongate, relatively broad plate-like cornutus, tapered to the anterior end, and one small, anteriorly pointed plate-like cornutus near ductus ejaculatorius base. Sternite A8 peg-like, narrowed to apex, with sclerotized lateral margins and two small, blunt apical arms; basal hollow broad and shallow; apical hollow very shallow.

Female unknown.

Range. China (Tibet).

Similar species. This species belongs to the “*proterva*” group (originally group ‘B’ of Inoue, 1979). *E. missionerata* is unlikely to be confused with any other Asian *Eupithecia* species. The general coloration is most similar to *E. atuni* Mironov & Galsworthy, 2006 (SW China), but the pale areas are much more extensive. The male genitalia resemble those of *E. subbreviata* Staudinger, 1897 (Palearctic Asia), but can be distinguished from the latter by the narrower biapical uncus, the narrower and longer papillae on the anterior arms of the labides and the differ-

ent shape of the eighth sternite, which is longer and narrower, with two short apical projections.

Holotype: ♂, [China], Thibet, Tà-tsieñ-loû, Mai, Juin 1896, Chasséurs Thibétains, Mironov slide no. 636 ♂ (TTM).

***Eupithecia wangi* Galsworthy & Mironov, sp. n.** (Fig. 4)

Description. Wingspan 20–22 mm; fore wing 11.5–12 mm. Fore wing somewhat narrow and elongate, with costal margin curved near base and apex, oblique termen, pointed apex and rounded tornus; ground colour greyish brown; transverse lines almost invisible, apart from postmedial, which consists of a diffuse double pale stripe almost parallel to termen until close to costa, where sharply angled basad and then right angled onto costa, where it appears as a distinct pale spot; basad of postmedial lines, a series of short black lines on veins; terminal area with indistinct dentate whitish subterminal line; discal dot small, rounded or ovoid, black; terminal line relatively broad, blackish brown, interrupted by veins. Hind wing short, with apex acutely and tornal angle obtusely rounded; ground colour paler, whitish grey; tornal area darker; dark transverse lines wavy, well marked in anal half only; posterior half of wing with a row of subterminal dark arrow-shaped marks; discal dot small, pale, ovoid or linear. Fringes distinctly spotted with dark and light.

Male genitalia (Fig. 19). Uncus short and narrow, pointed, uniaipical. Valva shaped like an orange segment, slightly elongate and rather narrow, with slightly bowed dorsum, evenly curved ventral margin and narrowly rounded apex; sacculus thickened, lightly sclerotized. Vinculum somewhat elongate by comparison with similar species, pointed at apex, triangular. Papillae on the anterior arms of labides elongate and broad, covered with short setae at apices. Aedeagus large and stout, considerably longer than length of valva. Vesica covered with numerous minute dentate spikes, and armed with one very long, longitudinally folded cornutus, the apex curved and truncate, and also with other smaller, folded, irregular cornutus near anterior end of aedeagus. Sternite A8 peg-like, broadened basally with an obtuse apex; basal hollow very shallow.

Female genitalia (Fig. 21). Bursa copulatrix large, ovoid-oblong, densely covered with small spines in the basal half from base of ductus seminalis diagonally to base of ductus bursae on the right side; also with a longitudinal row of spines along left side and a diagonal band of spines in the middle of the corpus bursae. Ductus bursae short and relatively narrow, membranous, unspined. Ductus seminalis long and narrow, broadened at base, attached to anterior part of corpus bursae near its base on left side. Colliculum absent. Antrum broad with marginal rows of

slim, pointed spinules. Tergite A8 quadrate, with sclerotized anterior margin and rounded posterior corners. Anterior and posterior apophyses of normal length, tapered to apices; posterior apophyses narrower than anterior. Papillae anales relatively small, elongate and narrow, with rounded apices, covered with sparse long setae.

Range. Southern China (Guangxi).

Similar species. *E. wangi* is externally superficially similar to *E. flavoapicaria* Inoue, 1979 (Japan, Taiwan) but easily distinguished from this latter by the much shorter pale spot on the fore wing costa, as well as the paler hind wings with distinctly bordered terminal areas. Both male and female genitalia are quite distinct from those of *E. flavoapicaria*.

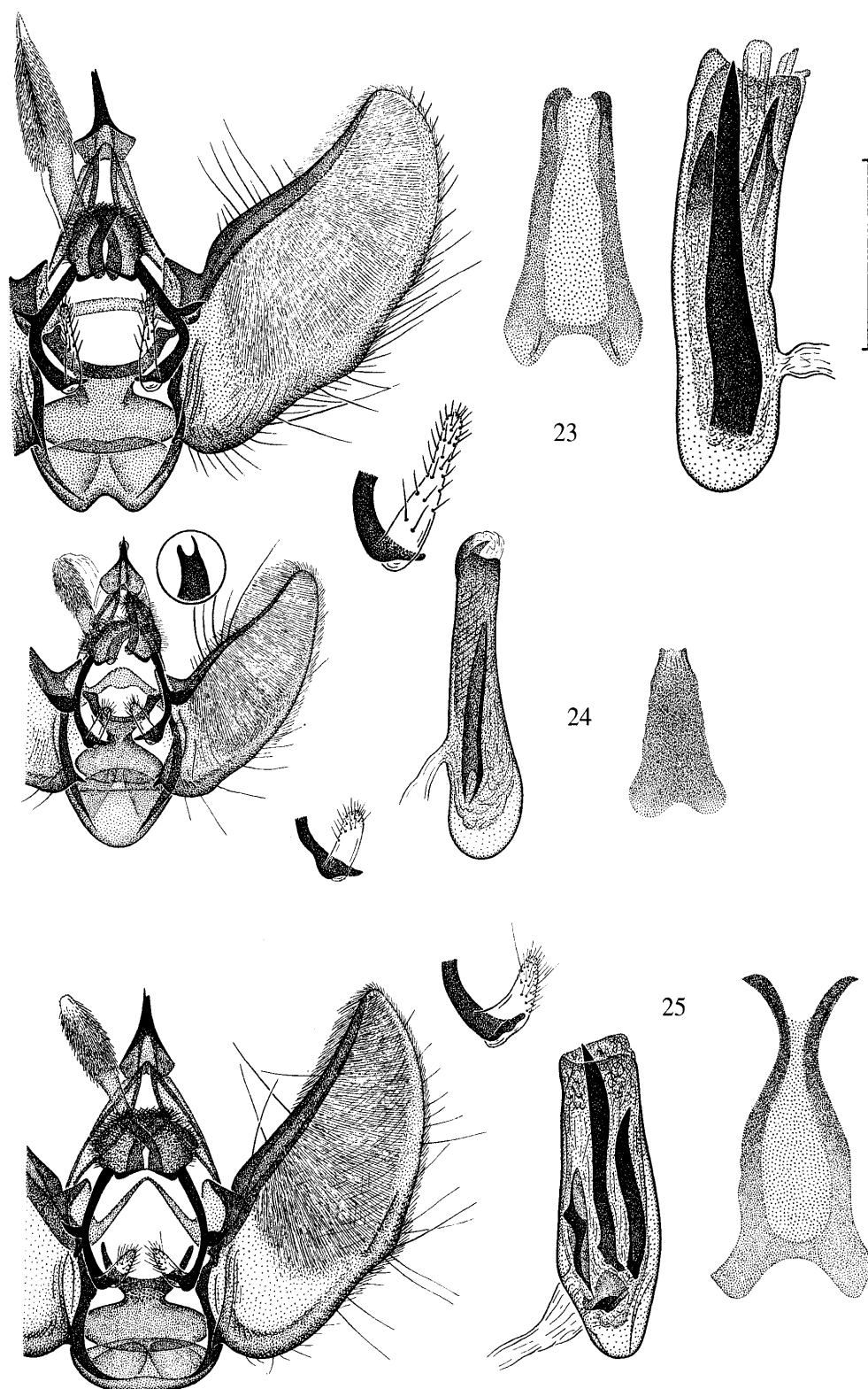
Holotype: ♂, China, Guangxi, Guilin, Mao'ershan, 500–1400 m, 26–29.iii.2005, M. Wang et al leg., Galsworthy slide nos NSMT-1 (SCAU). Paratypes: 2 ♂, 2 ♀, same locality, date and collector, Galsworthy slide nos NSMT-2 (NSMT, 1 ♂, 1 ♀, BMNH).

Derivatio nominis. This species is dedicated to Dr Wang Min (Department of Entomology of South China Agricultural University, Guangzhou).

***Eupithecia admiranda* Mironov & Galsworthy, sp. n.** (Fig. 5)

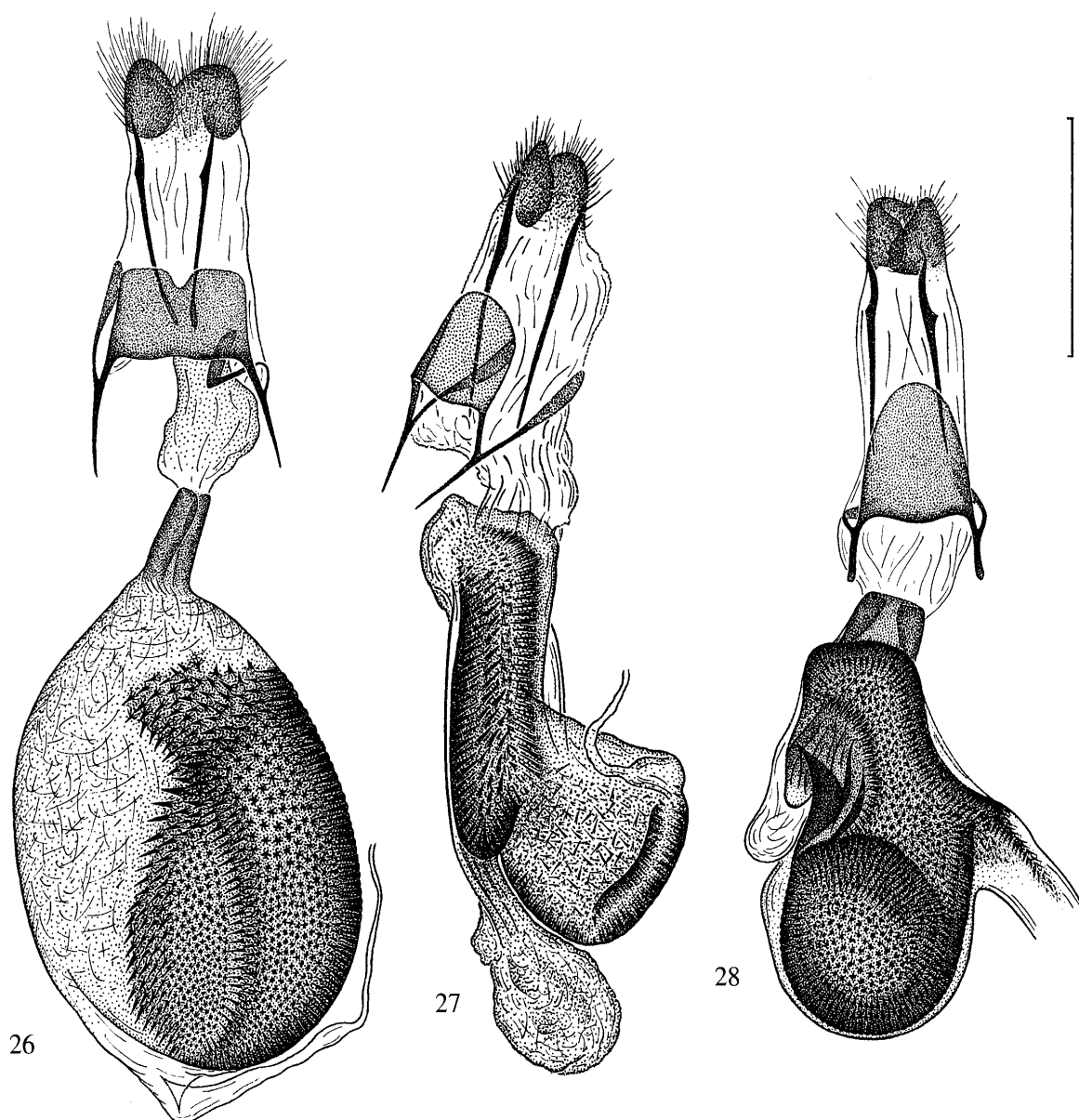
Description. Wingspan 22–24 mm; fore wing 11.5–12 mm. Labial palpi covered with brown scales. Frons brown, vertex and notum covered with reddish ochreous scales. Fore wing elongate, with arched costal margin, oblique termen and pointed apex; ground colour reddish ochreous; two conspicuous dark brown markings on costa at base, wedge-shaped, and at one half, triangular, and a further less well defined triangular mark at centre of dorsum; centre of medial area paler, reddish ochreous; discal dot conspicuous at apex of costal triangle, brownish black, ovoid; terminal area reddish ochreous with soft brownish tinge and two brownish blotches (medial and tornal); whitish subterminal line relatively broad; terminal line narrow, brown, interrupted by veins; fringe off-white, distinctly spotted with brown at vein endings. Hind wing paler, whitish with ochreous tinge, with double quadrate brown patches on anal margin representing basal and antemedial lines, and a more diffuse reddish brown mark representing postmedial line; terminal area bordered by a more or less visible wavy line; discal dot distinct, rounded, blackish; terminal line and fringe as fore wing.

Male genitalia (Fig. 24). Uncus short and narrow, but broadened and biapical in lateral view. Valva rather narrow, shaped like an orange segment, with slightly arched dorsal margin and narrowly rounded apex; sacculus lightly scler-



Figs 23–25. Male genitalia of *Eupithecia* species (scale bar = 1 mm: with sternite A8, and lateral view of uncus and papillae on the anterior arms of labides enlarged).

23: *E. hongxiangae* sp. n. 24: *E. admiranda* sp. n. 25: *E. hoenehermanni* sp. n.



Figs 26–28. Female genitalia of *Eupithecia* species (scale bar = 1 mm).

26: *E. admiranda* sp. n. 27: *E. hongxiangae* sp. n. 28: *E. hoenehermanni* sp. n.

otized. Vinculum elongate and relatively narrow, tapered to apex. Papillae on anterior arms of labides of average length and width. Aedeagus slim, relatively narrow, broadened anteriorly, longer than length of valva. Vesica covered with slightly oblique striations and armed with one long and narrow, plate-like cornutus, bifurcate at base. Sternite A8 peg-like, with two short and narrow, lightly sclerotized lateral thickenings near apex; basal hollow very small and shallow.

Female genitalia (Fig. 26). Bursa copulatrix large, ovate, membranous, about one half covered with dense spines of varying sizes on the left side, ranging from very small near base and gradually increasing in size towards col-

liculum. Ductus bursae absent, area around colliculum spineless. Ductus seminalis narrow, broadened to base, attached at anterior end of corpus bursae. Colliculum narrow and elongate. Antrum narrow, lightly sclerotized. Tergite A8 relatively small, rectangular, short and broad, with a shallow medial hollow in posterior margin and rounded posterior corners. Anterior and posterior apophyses short and narrow; posterior apophyses slightly expanded and flattened at apices. Papillae anales relatively small, rounded.

Range. China (Shaanxi, Tibet).

Similar species. This species belongs to the “*proterva*” group (‘Group B’ of Inoue, 1979). Externally it is a little

similar to *E. fletcheri* Prout, 1926 (southern Himalayas), which belongs to a different species group, but it is larger, and the costal and dorsal elements of the central band are separated, whereas in *fletcheri* the band is entire or almost entire. The male and female genitalia are typical of the “*proterva*” group. The male genitalia are similar to those of *E. subbreviata* Staudinger, 1897 (Palearctic Asia) and *E. hashimotoi* Inoue, 1988 (Taiwan), but the former has a uniapical uncus and different shape of eighth sternite; in *E. hashimotoi* the tip of the uncus is narrower and the aedeagus much larger and stouter. The female genitalia of *E. admiranda* are closest to those of *E. hashimotoi*, but in the latter the spiniferous area of the corpus bursae extends as far as the colliculum, which is much shorter than in *E. admiranda*.

Holotype: ♂, C. China, prov. Shaanxi, Foping Natural Reserve, Panda area, 1600 m, 15–20. iv. 1999, 33°45'N, 107°48'E, leg. V. Siniaev & A. Plutenko, Mironov slide no. 630 ♂ (ZFMK). Paratypes: 2 ♀, same data, Mironov slide no. 631 ♀ (ZFMK); 2 ♀, same data (ZISP); 2 ♀, same loc. and alt., 20. iv–11. v. 1999, 33°45'N, 107°48'E, leg. V. Siniaev & A. Plutenko (ZFMK); 1 ♀, same data (ZISP); 1 ♀, [China], Tibet, Tschang-Tang Dsagar-Berge, 4500 m, Juli (ZFMK).

***Eupithecia hongxiangae* Galsworthy & Mironov, sp. n.** (Fig. 6)

Description. Wingspan 18.5–22 mm; fore wing 8.5–11 mm. Fore wing relatively narrow and elongate, with a slightly arched costal margin, an evenly rounded, rather oblique termen and a pointed apex; ground colour grey or dark grey; transverse lines inconspicuous except on costa, where they form a series of dark spots; postmedial consisting of a series of dark dashes on the veins, with a narrow pale line outside them, sharply angled near costa; terminal area slightly darker with fine, wavy, whitish subterminal line; discal dot distinct, rounded or ovoid, black. Hind wing paler, whitish grey but shaded darker in anal and terminal areas; terminal area with a wavy whitish subterminal line and small whitish tornal dot; discal dot smaller and paler, rounded or comma-like.

Male genitalia (Fig. 23). Uncus elongate, thin, biapical. Valva long and broad, with bowed dorsal margin near base, slightly sinuate ventral margin and broadly rounded apex; sacculus lightly sclerotized. Vinculum broad with distinct medial hollow. Papillae on the anterior ends of labides long and narrow, narrowed medially and slightly broadened at apices, covered by sparse short setae. Aedeagus very large, stout, long and thick, equal to length of valva. Vesica armed with one long, stout, straight horn-like cornutus, one short, thick, obtuse horn-like cornutus and an elongate and narrow, folded, H-shaped cornutus.

Sternite A8 consisting of two almost parallel, long and relatively narrow rods, with blunt and curved, more sclerotized, cap-shaped tips, the rods connecting with each other by a short and narrow band at base; basal hollow broad and relatively deep; apical hollow membranous, broad and very deep.

Female genitalia (Fig. 27). Bursa copulatrix elongate and narrow, completely covered with large spines forming longitudinal rows and with small spines in its posterior part, with a narrow and elongate, membranous but thick-walled, basal diverticulum, broadened at apex and almost completely covered with chaotic, mainly small spines. Ductus bursae and colliculum not present. Ductus seminalis slightly broadened at base, attached to lateral diverticulum. Antrum membranous, short and broad. Tergite A8 relatively small, spade-shaped with rounded posterior margin. Anterior and posterior apophyses relatively short, narrow, pointed. Papillae anales small, short and rounded, covered with short and medium-sized setae.

Range. China (Gansu, Henan).

Similar species. This species belongs to the “*undata*” group (Mironov, 1990). It is most likely to be confused with *E. impavida* Vojnits, 1979 (Japan, China to Himalayas). It is externally extremely similar, though *E. hongxiangae* in fresh condition has the medial area of the fore wing rather shining grey, whereas it is a dull brown in *E. impavida*. The male and female genitalia should be examined for reliable determination: the long cornutus in the vesica is stouter and straighter than in *E. impavida*, and lacks the indented margin near the apex; the second cornutus is smaller, shorter, and less sclerotized. In the female the shorter and narrower corpus bursae and the apically broadened diverticulum are characteristic.

Holotype: ♀, China, Gansu, Wen county, Qiujiaba, 2350 m, 22. vii. 1999, Yao Jian, Galsworthy slide no. ZL570 ♀ (IZCAS). Paratypes: 1 ♂, China, Gansu, details as holotype; 1 ♂, China, Henan, Funiushan, 7–9.viii.1993, Wang Zhiguo, Galsworthy slides nos ZL559 ♂, ZL678 ♂ (IZCAS).

Derivatio nominis: this species is named in honour of Dr Han Hongxiang, IZCAS, China, who has published extensive research on the Chinese Geometridae.

***Eupithecia hoenehermanni* Mironov & Galsworthy, sp. n.** (Fig. 7)

Description. A medium-sized species. Wingspan 21–21.5 mm; fore wing 11–11.5 mm. Fore wing elongate, with an arched costal margin, narrowly rounded apex, evenly curved termen and rounded tornus; ground colour light ochreous brown; transverse lines distinct, oblique, brown; basal line right-angled onto costa; medial line sharply

angled onto costa near discal dot; postmedial line twice angled onto costa with broad brown inner shade; terminal area darker, brown with light ochreous brown apical streak; a similarly coloured large medial blotch between M_3 and CuA_1 and a light elongate tornal spot; discal dot relatively large, intensely black, ovate-acuminate; terminal line distinct, blackish brown, interrupted by veins; fringes distinctly chequered light ochreous brownish and brown or dark brown at vein ends. Hind wing ovoid, paler, off-white with weak brownish tinge; dark brown transverse lines distinct in anal third, oblique; discal dot small, pale brown, rounded or ovate; terminal line and fringes as fore wing.

Male genitalia (Fig. 25). Uncus relatively large, elongate, tapered to apex, biapical. Valva large, with very short and blunt medial ventral process; apex narrowly rounded; sacculus lightly sclerotized. Vinculum short and broad, rather square. Papillae on the anterior arms of labides relatively short, slightly tapered to apices. Aedeagus tapered to anterior end, broad and stout, shorter than valva length. Vesica armed with two parallel, sabre-shaped, slightly sinuate cornuti (one longer than the other), one elongate, twisted plate-like cornutus and another smaller, crumpled cornutus at ductus ejaculatorius base. Sternite A8 large, elongate, lyre-shaped, consisting of two narrow rods, pointed and sclerotized to apices and connected with each other by a narrow basal band; basal hollow broad and deep; apical hollow membranous, deep and broadened anteriorly.

Female genitalia (Fig. 28). Bursa copulatrix ovoid, elongate, sclerotized, almost completely covered with small spines except on the right side which carries a sclerotized patch with a short, blunt, membranous diverticulum in the middle. Ductus bursae not clearly differentiated from corpus. Ductus seminalis broadened, with an elongate area of small spines at base, attached to central part of corpus bursae at left side. Colliculum relatively short and broad, slightly inclined to the left. Antrum membranous, short and broad. Tergite A8 slightly elongate, tapered and rounded posteriorly, with strongly sclerotized anterior margin. Anterior apophyses narrow, short, apically blunt. Posterior apophyses of average length, slightly broadened to bases and tapered and pointed to apices. Papillae anales relatively small, short, rounded, covered with short and medium-sized setae.

Range. South western China (Yunnan).

Similar species. Unlikely to be confused with any other Chinese *Eupithecia* species because of the combination of the shape, coloration and pattern of the fore wings. The male genitalia are similar to those of *E. amacula* Mironov & Galsworthy, 2004 (south west China), but can be dis-

tinguished from this latter by the narrower apical half of the valva, the shorter papillae on the anterior arms of the labides, the two straighter horn-like cornuti on the vesica and the apically broader lateral arms of the eighth sternite. The female genitalia are distinctive, and do not closely match those of any other known species.

Holotype: ♀, [China], North Yunnan, A-tun-tse [Deqing], Mittlere Höhe (ca. 4000 m), 2. vii. 1936, H. Höne, Vojnits slide no. 11539 ♀ (ZFMK). Paratypes: 1 ♂, same locality, Talsohle ca. 3000 m, 29. v. 1937, H. Höne, Vojnits slide no. 13133 ♂ (ZFMK); 1 ♂, 3 ♀, China, North Yunnan, Diqing Tibetan Aut. Pref., 5 km SE of Deqing, 3356 m, 19. vi. 2009, leg. B. Benedek, Pekarsky slides nos OP 0850 ♀, OP 0851 ♀, 0853 ♀, OP 0855 ♂ (coll. O. Pekarsky).

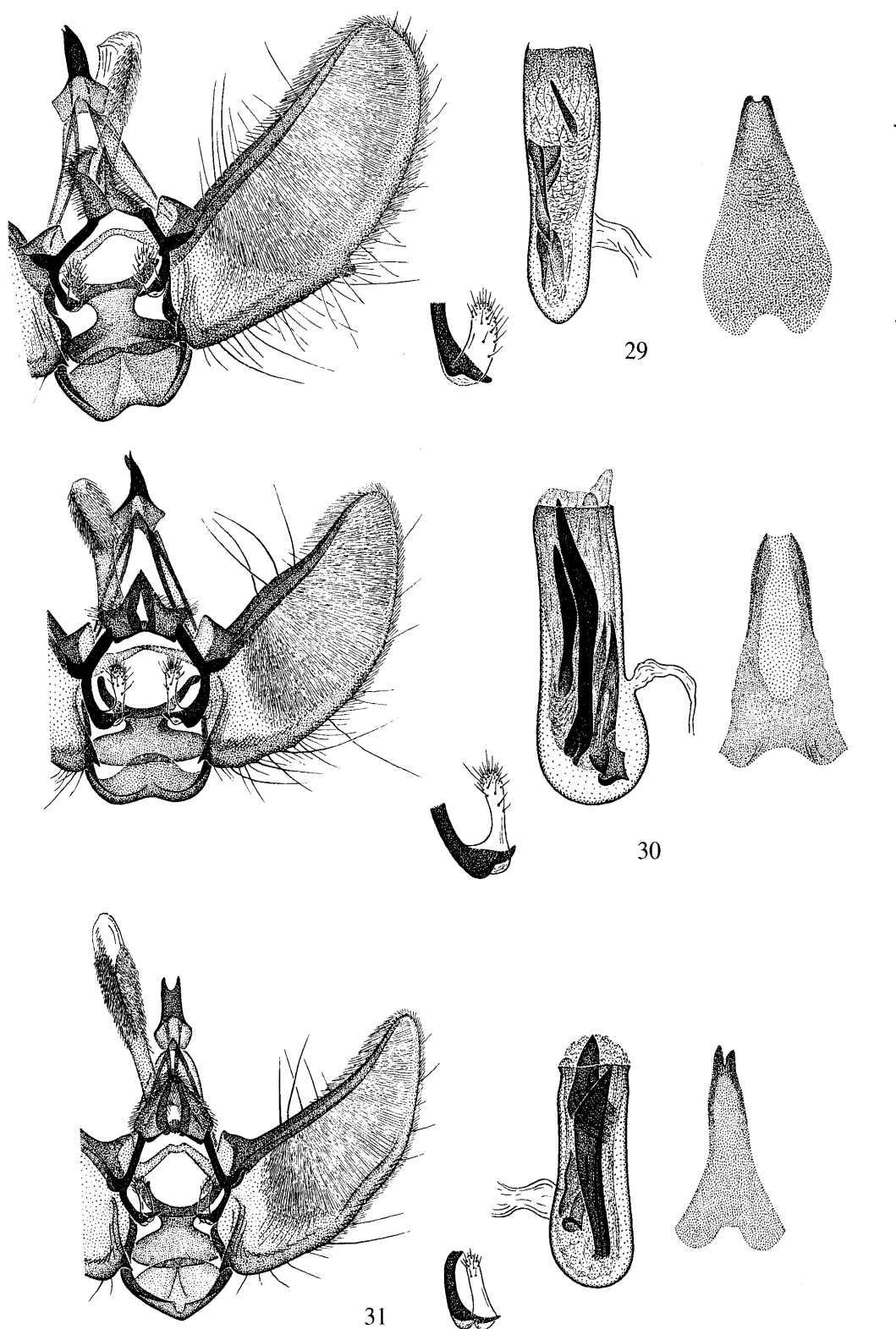
Derivatio nominis: The species is named after Dr Hermann Höne (1883–1963), the famous collector and explorer of the Lepidoptera fauna in China.

Eupithecia buysseata Mironov & Galsworthy, **sp. n.** (Fig. 8)

Description. A medium-sized species. Wingspan 20 mm, fore wing 11 mm. Fore wing rather elongate, with slightly bowed costal margin, relatively narrow apex and oblique termen; ground colour unicolorous, pale brown; basal area slightly darker, brownish; Cu vein covered with darker scales in basal area; all transverse lines inconspicuous; medial area with pale blotch between discal dot and indistinct postmedial transverse line which can just be seen to be right angled near the costa; discal dot small, black, slightly elongate, ovate-acuminate. Hind wing ovate, unicolorous pale brown, paler than fore wing; discal dot small, pale, rounded; fringes unicolorous brownish white.

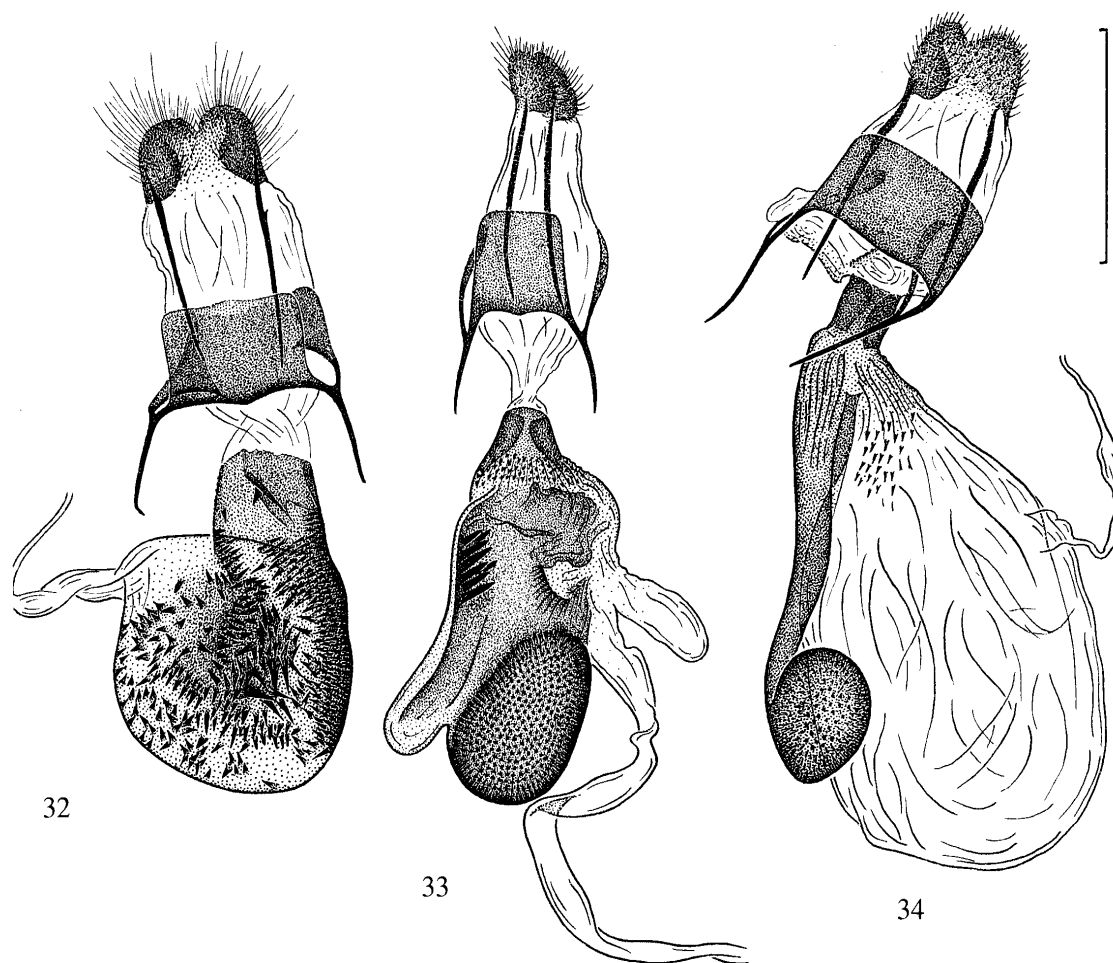
Male genitalia (Fig. 31). Uncus elongate, relatively broad, laterally flattened with two pointed horns. Valva shaped like a segment of an orange, broadened at base and evenly narrowed to apex, slightly curved with narrowly rounded apex; sacculus lightly sclerotized. Vinculum short and narrow, slightly tapered to apex. Papillae on the anterior arms of labides elongate and narrow. Aedeagus relatively short, shorter than length of valva. Vesica armed with two broad scalpel-shaped cornuti (the apical one short, curved at base with longitudinal striations, and the other long and evenly narrowed to base) and two twisted, plate-like cornuti near ductus ejaculatorius base (one elongate and the other smaller and irregular). Sternite A8 peg-like with heavily sclerotized lateral margins in the apical half, and with two short, tapered, asymmetrical apical horns; basal hollow smallish; apical hollow very small, shallow and narrow.

Female unknown.



Figs 29–31. Male genitalia of *Eupithecia* species (scale bar = 1 mm: with sternite A8, and papillae on the anterior arms of labides enlarged).

29: *E. amandae* sp. n. 30: *E. tamara* sp. n. 31: *E. buyseata* sp. n.



Figs 32–34. Female genitalia of *Eupithecia* species (scale bar = 1 mm).

32: *E. tamara* sp. n. 33: *E. manifesta* sp. n. 34: *E. amandae* sp. n.

Range. South western China (Yunnan).

Similar species. *E. buyseata* sp. n. belongs to the “*kamburonga*” group of species, which are characterized by a laterally bifid uncus (Mironov and Galsworthy, 2009). It is distinguished from all other members of the group, which have striking patterns with large white areas, by the unicolorous pale brown wings with inconspicuous transverse lines and white blotches only near the discal dots on the fore wings. The male genitalia fit the pattern of this group, with two cornuti in the aedeagus, but in the case of *E. buyseata*, the cornuti, especially the longer one, are broader than in any other species. They most resemble those of *E. yoshimotoi*, Inoue, 1988, from Taiwan, but apart from the different shape of the longer cornutus, the bifid arms of the uncus are pointed rather than spatulate as in *E. buyseata*.

Holotype: ♂, [China], Nord-Yünnan, A-tun-tse, Talsohle ca. 3000 m, 30. v. 1937, H. Höne, Vojnits slide no. 13141 ♂ (ZFMK).

Remarks. The single holotype male is worn, with most of the fringes worn off, especially on the fore wings.

Derivatio nominis: this species is dedicated to Baron Paul Buisse CMG, CBE in recognition of his unfailing fascination with the moths.

***Eupithecia amandae* Galsworthy & Mironov, sp. n.** (Figs 9, 10)

Description. Wingspan ♀ 24 mm, ♂ 20 mm, fore wing ♀ 13 mm, ♂ 11.5 mm. Fore wing elongate, broader in ♀ than ♂, apex acute, tornus obtusely curved. Hind wing oval, with almost straight termen; ground colour of both wings uniform pale slightly reddish brown, transverse lines darker brown; basal line angled near costa; antemedial double, extending from posterior margin almost to discal dot, the lines slightly converging; medial straight, passing just behind discal dot; postmedial thicker, parallel to medial in posterior half, rounded basad at level of discal dot, and sharply angled onto costa; three patches of darker brown scales subdorsally on antemedian, post-

median, and subternally; terminal area slightly darker, crossed by very weak wavy pale submarginal line; discal dot large, intense black and elongate; terminal line narrow, dark brown; fringes brown, not noticeably chequered. Hind wing with medial and postmedial lines clear right across wing, others visible only at anal margin; discal dot clear, slightly elongate.

Male genitalia (Fig. 29). Uncus elongate, broad and biapical. Valva elongate, rather narrow, with straight dorsal margin, broadly rounded apex and with a small, short and blunt medial process on the ventral margin; sacculus lightly sclerotized. Vinculum short, with shallow medial hollow. Papillae on the anterior arms of the labides relatively short and slightly curved. Aedeagus relatively short and narrow, shorter than length of valva. Vesica with transverse striations; armed with one slim, horn-like apical cornutus and two folded, plate-like, U-shaped cornuti (one medial and the other basal). Sternite A8 peg-like, elongate, broadened near base and sharply tapered to apex, with two very short and blunt apical horns and more strongly sclerotized lateral margins near apex; basal hollow relatively narrow and shallow.

Female genitalia (Fig. 34). Bursa copulatrix very small, almost globular, completely covered with small spines. Ductus bursae long and narrow, sclerotized, slightly sinuate, unspined, with longitudinal striae near colliculum. Ductus seminalis very large and broad, membranous, with a small patch of spinules near base. Colliculum collar-like, relatively large. Antrum short and broad, membranous. Tergite A8 short and broad. Anterior and posterior apophyses of average length, narrow, tapered to apices. Papillae anales rounded, covered with short setae.

Range. SW China (Yunnan).

Similar species. The prominent rather broad postmedial makes *Eupithecia amandae* reasonably distinctive externally. The male genitalia are very similar to those of *E. invicta* Vojnits, 1981 (southern Himalayas), but the vinculum is slightly narrower, the horn-like apical cornutus on the vesica shorter and narrower, and the eighth sternite narrower in its basal part. The moth is considerably larger than *E. invicta*. The female genitalia are similar in general shape to those of *E. tenuisquama* Warren, 1896 (Japan to Himalayas) and *E. invicta*, but can easily be distinguished by the much smaller corpus bursae, the narrower and shorter ductus bursae without a row of spines (which is present in *E. tenuisquama*), and above all by the massive ductus seminalis with a patch of very small spines at its base.

Holotype: ♂, [China], KIB/RBGE research stn., Lijiang, Yunnan prov., PR of China, 15–20 June 2009, A. C. Gals-

worthy, Galsworthy slide no. LJ5 ♂ (IZCAS). Paratype: 1 ♀, same loc. and data, Galsworthy slide no. LJ5 ♀ [= B. M. Geom. slide no. 22620 ♂] (BMNH).

Remarks: the female genitalia of this species are particularly interesting, as they appear to represent an extreme form of the pattern already evident in *E. tenuisquama* and *E. invicta*, where the corpus bursae is shrinking and the ductus seminalis expanding into a large membranous bag. It seems possible that the function of the corpus bursae is being taken over by the expanded ductus seminalis, leaving the original corpus bursae shrunken, and it may be that this shrunken corpus bursae is the origin of some of the blind sclerotized appendages sometimes seen on the ductus bursae in a number of species.

Derivatio nominis: this species is dedicated to Mrs Amanda Phillips in commemoration of her wedding.

Eupithecia manifesta Mironov & Galsworthy, sp. n. (Fig. 12)

Description. A small species. Wingspan 16–17.5 mm; fore wing 9.5–10 mm. Labial palpi, frons and vertex brown. Notum light greyish brown with dark brown transverse band anteriorly. Fore wing relatively elongate and narrow with arched costal margin, evenly curved termen and narrowly rounded apex; ground colour brownish with rusty tinge; transverse lines inconspicuous, pale postmedial line twice right angled onto costa; discal dot rather large and very distinct, ovoid, black; terminal area with traces of narrow, light subterminal line and a series of elongate blackish dashes along termen between veins; terminal line dark brown; fringe chequered light and dark brown. Hind wing elongate, paler, off-white in anterior half, with a conspicuous creamy area around apex, and darker brownish along anal and terminal margins; transverse lines indistinct; terminal area with clear, small, white tornal spot; discal dot smaller and paler than on fore wing, rounded or ovate; terminal line and fringe as fore wing.

Female genitalia (Fig. 33). Bursa copulatrix small, ovate, completely covered with very small spines. Ductus bursae elongate, broad, sclerotized, more strongly sclerotized along right side, with two membranous, elongate diverticula (one in the anterior part and the other central) on opposite sides, also with two separate patches of spines (one patch of large spines on the right side and another patch of minute spines near base of colliculum). Ductus seminalis long, slightly broadened near base, attached at the base of the ductus bursae on the left side. Colliculum collar-like, short, rather narrow, and narrowing posteriorly. Antrum membranous, relatively short, sharply broadened towards ostium. Tergite A8 small, almost square. Anterior and posterior apophyses narrow, tapered to apices. Papillae

anales small, ovoid, covered with short setae.

Male unknown.

Range. China (Yunnan).

Similar species. This species belongs to the “*propagata*” group (the “*inepta-sacrosancta*” group of Vojnits, 1984). It is most similar externally to *E. caduca* Vojnits, 1984 (south west China) and distinguished from it only by the more prominent, oval-elongate discal dots on the fore wings. The female genitalia are quite distinct from those of *E. caduca*, and from those of other members of the group. They have a slight similarity with those of *E. laudabilis* Vojnits, 1984 (south west China), but can be distinguished by the ovate corpus bursae covered with smaller spines, the presence of two membranous diverticula on opposite sides of the ductus bursae, and by the smaller papillae anales.

Holotype: ♀, China, Prov. North Yunnan, Li-kiang [Lijiang], ca. 3000 m, 4. x. 1934, H. Höne, Vojnits slide no. 13117 ♀ (ZFMK). Paratype: 1 ♀, same data, Vojnits slide no. 11447 ♀ (ZFMK).

Eupithecia tamara Mironov & Pekarsky, **sp. n.** (Fig. 13)

Description. Wingspan 20.5 mm; fore wing 12 mm. Fore wing relatively elongate with costal margin arched near apex, evenly curved termen and narrowly rounded apex; ground colour greyish brown with ochreous tinge; transverse lines distinct, black, oblique, sharply angled onto costa; median line forming a distinct arrowhead shape distal of discal spot; postmedial line twice sharply angled onto costa and forming an oblique, black costal spot; terminal area darker, brownish, with indented, pale subterminal line and a series of black, elongate dashes between veins along terminal margin; discal dot large, ovate-oblong, oblique, black; terminal line relatively broad, black; fringe chequered rusty brown and blackish brown. Hind wing elongate, paler, light ochreous; blackish transverse lines distinct along anal margin only, this area being sharply differentiated from paler remainder of wing; discal dot relatively large, black, triangulate; terminal line broadened to tornus; fringe paler than on fore wing.

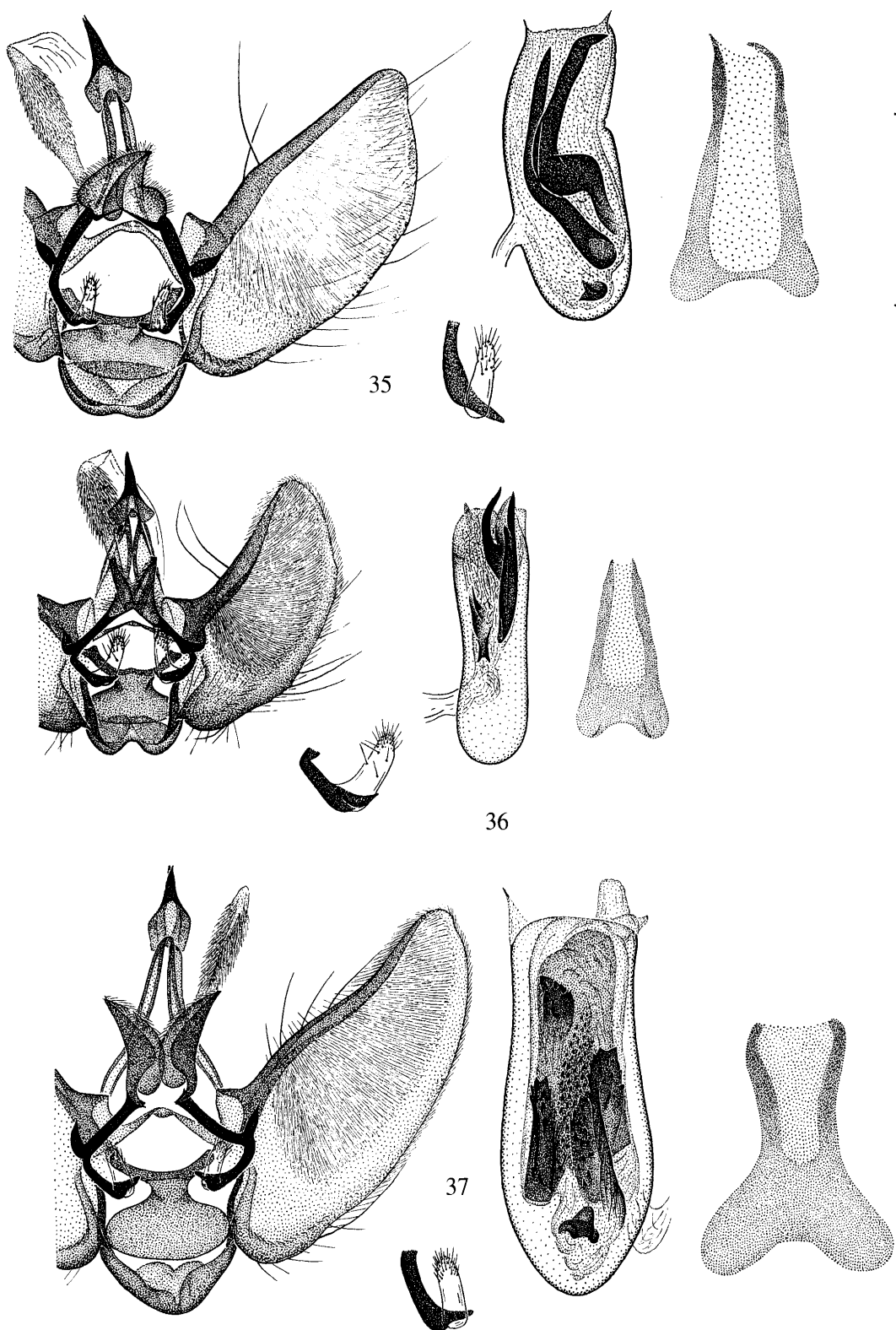
Male genitalia (Fig. 30). Uncus stout, biapical. Valva shaped like an orange segment, with dorsal margin slightly bowed medially, evenly curved ventral margin and narrowly rounded apex; sacculus lightly sclerotized. Vinculum short and broad, rather trapezoid with very shallow medial hollow. Papillae on the anterior arms of labides elongate, narrow, clavate, covered with sparse medium-sized setae at apices and along inner sides. Aedeagus elongate, stout, slightly shorter than length of valva. Vesica armed with two narrow and elongate, slightly curved

horn-like cornuti (one about half the length of the other), and with one elongate, plate-like, V-shaped cornutus, broadened at one of the ends near the ductus ejaculatorius base. Sternite A8 elongate, with two narrow, elongate, almost parallel and apically pointed rods, heavily sclerotized along their outer margin; basal hollow broad and shallow; apical hollow membranous, relatively narrow and deep.

Female genitalia (Fig. 32). Bursa copulatrix small, almost globular, membranous, and almost completely covered with small spines, which coalesce into a dense elongate patch of larger spines on the right side which extend to the base of the colliculum; area near ductus seminalis spineless. Ductus bursae not expressed. Ductus seminalis slightly broadened at base, attached to posterior part of corpus bursae near base of colliculum. Colliculum rather plate-like, sclerotized, relatively large and broad. Antrum short, wide, membranous. Tergite A8 rectangular, short and broad, with sclerotized anterior margin and lightly sclerotized, broad shallow medial hollow on posterior margin. Anterior and posterior apophyses relatively short and narrow. Papillae anales rounded, covered with long and some shorter setae.

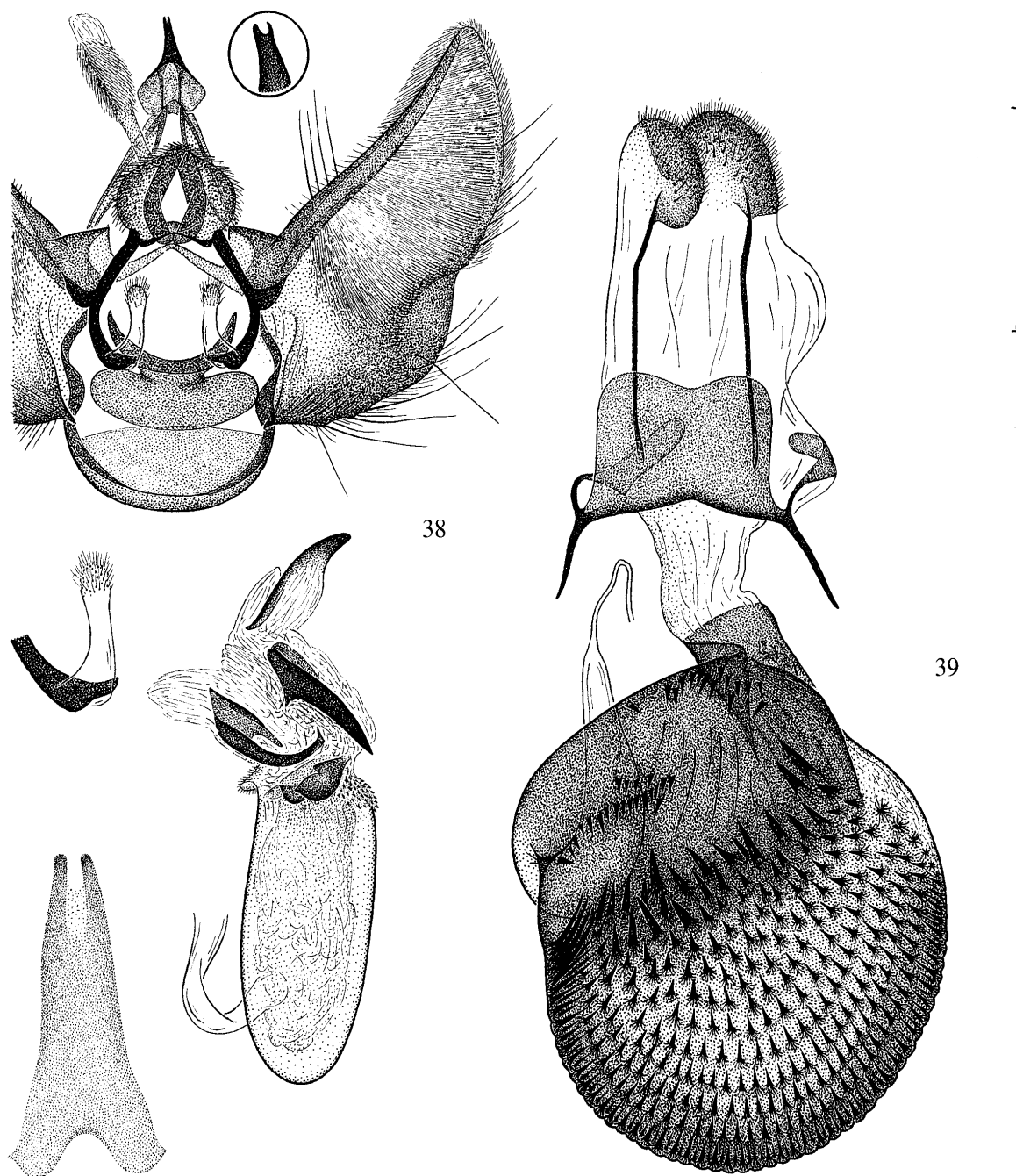
Range. China (Sichuan).

Similar species. This species is externally similar to *E. repentina* Vojnits & De Laever, 1978 (European Russia to Far East, south to central China) and *E. fatigata* Vojnits & De Laever, 1978 (south west China). However, in *E. repentina* the transverse lines, especially the ante- and postmedial, are less sharply angled onto the costa, the discal dot on the fore wing is usually narrower, and the hind wing has a less rounded terminal margin and rather inconspicuous transverse lines along the anal margin. *E. fatigata* has narrower, more elongate wings with an oblique termen and rather pointed apex, the antemedial line less sharply angled onto the costa, the postmedial line more oblique, the subterminal line forming a small, whitish tornal spot, and the discal dot longer and narrower on the fore wing; the hind wing is also narrower and more elongate, ovoid, with a distinct white tornal spot. The male is easily recognized from other allied species by the combination of the shape of valva, the almost trapezoid vinculum, the elongate and clavate papillae on the anterior arms of the labides, the presence of the two slim and elongate horn-like cornuti on the aedeagus vesica, and the different shape of the eighth sternite. The female genitalia are similar to those of *E. nepalata* Schütze, 1961 (south west China and Himalayas) and *E. eximia* Vojnits & De Laever, 1978 (south west China). However, *E. nepalata* has a smaller spiniferous area in the corpus bursae with slimmer spines, a different disposition of the ductus seminalis and



Figs 35–37. Male genitalia of *Eupithecia* species (scale bar = 1 mm: with sternite A8, and papillae on the anterior arms of labides enlarged).

35: *E. qinlingata* sp. n. 36: *E. svetlanae* sp. n. 37: *E. tectoria* sp. n.



Figs 38–39. Male and female genitalia of *Eupithecia* species (scale bar = 1 mm: male with sternite A8, and lateral view of uncus and papillae on the anterior arms of labides enlarged).

38: *E. sacrosancta* Vojnits, 1979 (male) 39: *E. tectaria* sp. n. (female).

a shorter colliculum; lastly *E. eximia* also has a smaller spiniferous area in the corpus bursae with larger spines, and a large, membranous spineless area, a different disposition of the dense patch of larger spines and also of the ductus seminalis.

On the basis of similarities in the structure of the female genitalia, the species *E. eximia* Vojnits & De Laever, 1978, *E. nepalata* Schütze, 1961, *E. fatigata* Vojnits & De

Laever, 1978, *E. tamara* sp.n., *E. repentina* Vojnits & De Laever, 1978, *E. latimedia* Hampson, 1895 (Himalayas) and also *E. virgaureata* Doubleday, 1861 (Palearctic) are closely allied, and constitute a group of species with a small membranous bursa copulatrix with a distinctive disposition of spines, a short membranous antrum and a relatively large, broad, rectangular eighth tergite.

Holotype: ♀, China, W. Sichuan, Xindugiao evn 3500 m,

30°04'N / 101°26'E, 14. vii. 2009, I. & A. Floriani, Saldaitis leg., Pekarsky slide no. OP 0514 ♀. Paratypes: 1 ♂, data as holotype, Pekarsky slide no. OP 0192 ♂; 1 ♂, China, W. Sichuan, Litang evn 4000 m, 29°50'N, 100°21'E, 16.vii. 2009, same collectors, Pekarsky slide no. OP 0735 ♂ (all coll. O. Pekarsky, Budapest).

Derivatio nominis: the name of this species is dedicated to Tamara Mironova – the mother of Vladimir Mironov.

***Eupithecia qinlingata* Mironov & Galsworthy, sp. n.** (Fig. 14)

Description. Wingspan 18 mm, fore wing 10 mm. Fore wing relatively broad; costa almost straight, gently curved near apex; termen evenly curved; apex pointed; ground colour pale brownish grey; transverse lines inconspicuous; postmedial line obtuse, angled onto costa, forming a dark costal spot and with dark wedge-shaped marks on the veins; terminal area slightly darker, especially near apex, with light tornal spot; discal dot distinct, rounded. Hind wing ovoid, paler; transverse lines well marked along anal margin only; terminal area with small, whitish tornal spot; discal dot minute, pale, rounded.

Male genitalia (Fig. 35). Uncus relatively large, elongate, biapical. Valva large, elongate and rather broad with narrowly rounded apex; sacculus lightly sclerotized. Vinculum short, trapezoid. Papillae on the anterior arms of labides narrow, covered with sparse short setae. Aedeagus relatively short and stout, shorter than length of valva. Vesica armed with one small, irregular plate-like cornutus and two large horn-like cornuti (one slightly curved at the middle and the other twice sharply curved in the basal half and slightly curved near apex). Sternite A8 relatively large, broad, consisting of two narrow, parallel, apically pointed rods connected with each other by a narrow basal band; basal hollow shallow and broad; apical hollow membranous, broad and deep.

Female unknown.

Range. China (Shaanxi).

Similar species. Externally, on the base of the shape and pattern of the wings, *E. qinlingata* is very similar to the holotype specimen of *E. vojnitzi* Inoue, 2000 (= *tenebri-cosa* Vojnits, 1983, praecoc., nec Schaus, 1913) from Nepal (Inoue, 2000, pl. 168: 17 ♂), and is likely to be closely related to it. However, the male genitalia differ. The papillae on the anterior arms of the labides are shorter and narrower, the aedeagus is shorter and much broader, the curved cornutus is much longer and the doubly angled one shorter and with much sharper angles.

Holotype: ♂, [China], Sued-Shensi [Shaanxi], Tapaishan [Dabaishan] im Tsinling [Qinling], ca. 1700 m, 6. viii.

1936, H. Höne, Vojnits slide no. 12951 ♂ (ZFMK).

Remarks. The holotype specimen of *E. qinlingata* sp. n. was identified by Vojnits (1981) as a male of *E. praecipitata* Vojnits, 1979, which was based on a female: the true male of the latter is that subsequently described by Vojnits (1980) as *E. iterata* and (1984) as *E. tempestuosa*. The holotype male of the present species is worn, with all the fringes completely worn away.

***Eupithecia svetlanae* Pekarsky & Mironov, sp. n.** (Fig. 15)

Description. Wingspan 17 mm; fore wing 9.5 mm. Fore wing broad with slightly bowed costal margin, evenly curved terminal margin and narrowly rounded apex; ground colour almost unicolorous ash-grey; basal area blackish brown along costa; basal transverse line oblique; antemedial line inconspicuous, right angled and broadened onto costa; postmedial line formed by a series of dark dashes on the veins, evenly curved onto costa and forming a large blackish brown costal blotch; discal dot distinct, black, ovoid-acuminate; terminal area slightly darker, with whitish tornal spot and a whitish wavy subterminal line, both bordered by shading inside and also with a large blackish brown subapical blotch on costa; area between postmedial and subapical costal blotches rusty ochreous; terminal line dark brown, interrupted by veins; fringe distinctly chequered dirty white with brownish tinge and brown at vein ends. Hind wing broad, rather ovoid, also unicolorous ash-grey, slightly darker along anal and terminal margins, with veins covered with dark scales and with indistinct transverse lines; whitish tornal spot large, distinct, rounded, bordered with blackish shade inside; discal dot rounded, relatively large but smaller than on fore wing; terminal line and fringe as fore wing.

Male genitalia (Fig. 36). Uncus elongate, biapical. Valva small, shaped like an orange segment with narrowly rounded apex; sacculus lightly sclerotized. Vinculum short and narrow with relatively deep medial hollow. Papillae on the anterior arms of labides slightly curved, covered with short setae at apices. Aedeagus stout, slightly shorter than length of valva. Vesica armed with two rather slim, apical horn-like cornuti (one curved and other longer, straight, bifurcate from close to base, but diverging only at extreme apex) and one small, irregular plate-like cornutus near ductus ejaculatorius base. Sternite A8 weakly sclerotized, with two almost parallel, arms, pointed at apices, connected to each other by a broad basal band; basal hollow shallow; apical hollow deep, membranous.

Female unknown.

Range. China (Sichuan).

Similar species. According to the structure of the male genitalia, *E. svetlanae* belongs to a species-group related to *E. rajata* Guenée, 1858 from the Indian subcontinent. Externally, it resembles a number of species in this group, including *rajata* itself, and also the Himalayan *E. vojnitsi* Inoue, 2000 (= *tenebricosa* Vojnits, 1983, Nepal), but it is distinguished by the presence of unusually large and distinct whitish tornal spots, especially on the hind wings. The male genitalia of *E. svetlanae* are very clearly distinguished from those of other members of the group by the unique pattern of cornuti on the vesica of the aedeagus.

Holotype: ♂, 26.06–12.07.2008, China, Sichuan, Lao Lin Kou, ~1900 m, 28°21'N, 103°26'E, leg. Viktor Sinyaev, Collection Oleg Pekarsky, Pekarsky slide no. OP 0244 m (coll. O. Pekarsky, Budapest).

Remarks. The holotype male is worn, with the fringes completely worn out on the all wings.

Derivatio nominis: this species is dedicated to Svetlana Pekarsky, the wife of the collector of Lepidoptera Mr Oleg Pekarsky (Budapest, Hungary).

***Eupithecia tectaria* Mironov & Galsworthy, sp. n.** (Fig. 16)

Description. A large species. Wingspan 24 mm; fore wing 12 mm. Labial palpi covered with dark brown scales. Frons, notum and patagia ash-grey. Fore wing elongate, with slightly bowed costal margin, oblique termen and rather pointed apex; ground colour pale brown, slightly darker in terminal area; transverse lines inconspicuous; postmedial line obtusely angled onto costa; discal dot small, rounded, black; terminal line dark brown, interrupted by vein ends; fringe chequered light and dark brown. Hind wing elongate, ovoid, also pale brown, marked with inconspicuous transverse lines; discal dot small, rounded, dark brown; terminal line and fringe as on fore wing.

Male genitalia (Fig. 37). Uncus elongate, biapical. Valva large and broad, with costal margin sinuous and bowed in middle, apex rounded; sacculus evenly rounded, unmodified. Vinculum broad, semicircular. Papillae on anterior arms of labides relatively short, with parallel sides. Aedeagus very stout, with three stout toothed cornuti at centre, a small irregular plate closer to apex, and a twisted sclerotized knot near base. Sternite A8 with basal part very broad, narrowing rapidly to mid point, from where it branches into two sinuous arms; basal hollow shallow, apical hollow very deep.

Female genitalia (Fig. 39). Bursa copulatrix large, almost globular, sclerotized in posterior half, about 2/3 covered with large spines; marginal spines large, stout, considerably larger than the rest; a transverse row of small spines

near base of ductus seminalis. Ductus bursae short, broad, sclerotized, covered with numerous longitudinally oblique striations, with short transverse row of small spines near base of colliculum. Colliculum collar-like, short and broad, inclined to right. Antrum broad, membranous. Tergite A8 large, rather rectangular, with sclerotized and medially concave anterior margin, rounded posterior corners and medially concave posterior margin. Anterior apophyses relatively short, broader than posterior; posterior apophyses narrow, slightly expanded at apices. Papillae anales large, broad, rounded, covered with very short setae.

Range. China (Fujian).

Similar species. This species belongs to the “*cretacea*” group (Bolte, 1990), and is very similar externally to *E. veratraria* Herrich-Schäffer, 1848 (Palearctic), but can be distinguished from it by the generally darker ground colour, and the narrower fore wing with oblique termen and rather pointed apex. The male genitalia are easily distinguished from the latter by the presence of the three toothed cornuti. The female genitalia are also broadly similar to those of *E. veratraria*, but the corpus bursae is broader and more rounded, and the field of spines much more extensive.

Holotype: ♀, [China], [Fujian], Kuatun (2300 m), 27, 40 n. Br. 117, 40 ö., L. J. Klapperich, 6. v. 1938 (Fukien), 2a P5, Mironov slide no. 826 ♀ (ZFMK). Paratype: 1 ♂, details as holotype, but 21.iv.1938 (Fukien), Vojnits slide no. 12253 ♂ (ZFMK).

***Eupithecia sacrosancta* Vojnits, 1979** (Fig. 11)

Vojnits (1979) described a new species, *Eupithecia sacrosancta*, in his paper of 1979 on the Chinese *Eupithecia*, based on a single holotype. The specimen marked as holotype of this species is referenced by its labels to a genitalia slide, no. 11424, with a distinct form of male genitalia, and Vojnits' description is accompanied by drawings which are clearly derived from this slide. However, the specimen in question is a female of *E. lasciva* Vojnits, which he described in a separate paper the following year (Vojnits, 1980). Evidently there was an error in labelling during the dissection process which resulted in the genitalia slide being linked to the wrong specimen. We have not been able to discover which was the correct specimen. Since Vojnits' differentiation of this species was primarily based on the male genitalia, we therefore take the genitalia slide as constituting the holotype of *E. sacrosancta*, and disregard the specimen itself.

We have found a similar error in relation to one of the paratypes of *E. fenita* Mironov & Galsworthy, 2004, referenced to Vojnits slide no. 12482. The specimen is certainly referable to *E. fenita*, which is quite a distinctive

species, but the slide carries the genitalia of a male of *E. sacrosancta*.

We have recently found a complete specimen of this species collected in 1998, and illustrate it here together with a drawing of its genitalia, which are identical to those of the holotype genitalia slide of *E. sacrosancta*.

Redescription. A medium-sized species. Wingspan 19 mm, fore wing 10.5 mm. Fore wing with slightly bowed costal margin and evenly curved termen; hind wing rather ovoid with narrowly rounded apex; ground colour of fore wings greyish brown with yellowish tinge; ante- and postmedial transverse lines slightly oblique, right angled onto costa; discal dot more or less rounded.

Male genitalia (Fig. 38). Uncus stout, short and broad, sharply tapered and pointed to tip, biapical. Valva elongate and broad, with slightly bowed dorsal margin, narrow apex and with an elongate sclerotized ventral flange, protruding from a deep elongate wrinkled depression; sacculus sclerotized. Vinculum broadly rounded. Papillae on the anterior arms of the labides long and thin, covered by sparse short setae at apices. Aedeagus short and thick, shorter than length of valva. Vesica armed with two slim, slightly curved and rather elongate, apical horn-like cornuti, and with one broad, longitudinally folded, U-shaped cornutus and one smaller, sharply curved, irregular cornutus near ductus ejaculatorius base. Sternite A8 peg-like, elongate, tapered to apex, with two long and relatively narrow rods with blunt and sclerotized tips; basal hollow relatively broad and deep; apical hollow membranous, very narrow and deep.

Female unknown.

Range. China (Shaanxi).

Similar species. This species belongs to the “*propagata*” group (the “*inepta-sacrosancta*” group of Vojnits, 1984). The single known complete specimen is very worn. The male genitalia are generally similar to those of *E. placida* Vojnits, 1984, *E. batangi* Vojnits, 1984 and *E. caduca* Vojnits, 1984 (all south west China). They can be distinguished by the larger valva with narrowly rounded apex, longer papillae on the anterior arms of the labides, as well as by the horn-like cornuti on the vesica, which are longer than in *E. placida* and *E. batangi*, but shorter than in *E. caduca*. The shape of the eighth sternite in the male is also distinct, especially from that of *E. placida*.

Material examined: Vojnits slide no. 11424♂ (holotype of *E. sacrosancta*), provenance uncertain; Vojnits slide no. 12482♂, provenance uncertain (originally cited as paratype of *E. fenita*; both ZFMK). 1♂, Central China, prov. Shaanxi, Mt. Tai Bei Shan, 33°35'N, 107°43'E,

1300–1500 m, 10. viii–4. ix.1998, leg. V. Murzin & V. Siniaev, Mironov slide no. 746♂ (ZFMK).

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References

- Bolte, K.B., 1990. Guide to the Geometridae of Canada (Lepidoptera), VI. Subfamily Larentiinae. 1. Revision of the genus *Eupithecia*. *Mem. Entomol. Soc. Can.* **151**: 1–253.
- Inoue, H., 1979. Revision of the genus *Eupithecia* of Japan, Part I (Lepidoptera, Geometridae). *Bull. Fac. Dom. Sci. Otsuma Wom. Univ.* **15**: 157–224.
- Inoue, H., 2000. *Eupithecia* Curtis (Geometridae, Larentiinae) from Nepal. In Haruta, T. (ed.), *Moths of Nepal*, part 6. *Tinea* **16** (Supplement 1): 27–44.
- Mironov, V., 1990. Sistematischeskij katalog pjadentiz tribu *Eupitheciini* (Lepidoptera, Geometridae) fauny SSSR, I. *Entomol. Obozr.* **69** (3): 656–670. (In Russian)
- Mironov, V.G. and A. C. Galsworthy, 2009. A survey of the genus *Eupithecia* (Lepidoptera, Geometridae) in mainland South East Asia: Part I. *Trans. lepid. Soc. Japan* **60** (2): 93–116.
- Mironov, V. G., A. C. Galsworthy and D. Xue. 2004a. New species of *Eupithecia* (Lepidoptera: Geometridae) from China, part I. *Trans. lepid. Soc. Japan* **55** (1): 39–57.
- , 2004b. New species of *Eupithecia* (Lepidoptera: Geometridae) from China, part II. *Trans. lepid. Soc. Japan* **55** (2): 117–132.
- , 2004c. New species of *Eupithecia* (Lepidoptera: Geometridae) from China, part III. *Trans. lepid. Soc. Japan* **55** (3): 225–242.
- , 2004d. New species of *Eupithecia* (Lepidoptera: Geometridae) from China, part IV. *Trans. lepid. Soc. Japan* **55** (4): 285–300.
- , 2006. New species of *Eupithecia* (Lepidoptera: Geometridae) from China, part V. *Trans. lepid. Soc. Japan* **57** (4): 335–353.
- Vojnits, A. M., 1979. New and rare *Eupithecia* species from China (Lepidoptera, Geometridae). *Acta Zool. Acad. Sci. Hung.* **25** (1–2): 193–211.
- , 1980. Data to the *Eupithecia* fauna of China (Lepidoptera: Geometridae). *Acta zool. Acad. Sci. hung.* **26** (4):

443–447.

——, 1981. On some Chinese *Eupithecia* material collected by H. Höne (Lepidoptera: Geometridae). *Acta Zool. Acad. Sci. Hung.* **27** (3-4): 407–430.

——, 1984a. New data to the *Eupitheciini* fauna of China based on Höne's collections. *Acta Zool. Hung.* **30** (1-2): 213–240.

——, 1984b. Investigations in the “*Eupithecia inepta-sacrosancta*” and the “*E. lasciva*” groups (Lepidoptera, Geometridae). *Acta Zool. Hung.* **30** (3-4): 523–544.

摘 要

中国産カバナミシャク属の新種 VI (V. G. Mironov, A. C. Galsworthy, Xue D., O. Pekarsky)

中国産カバナミシャク属の14新種を記載するとともに、*Eupithecia sacrosancta* Vojnits, 1979のホロタイプの問題点について言及した。Vojnits (1979)は1個体にもとづいて*E. sacrosancta*を記載した。Vojnitsの交尾器の記載はホロタイプとされる交尾器スライド (no.11424)と一致していたが、ホロタイプラベルが付けられた標本は、Vojnitsが翌年(1980年)に記載した*E. lasciva*の♀だった。これは明らかにラベルの付け間違いによるもので、交尾器スライドをホロタイプと見なすべきである。我々は1998年に採集された新たな個体を見出したので、この標本にもとづいて*E. sacrosancta*の再記載を行った。

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